[JP,05-221103,A]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the image recorder which performs serial record.
[0002][Background of the Invention] -- the image recorder which performs serial record is conventionally constituted like drawing 26. The cassette 3 into which two or more web materials 2 were loaded is arranged at the pars basilaris ossis occipitalis of the main part 1 of an image recorder. In drawing 26, the carriage 5 by which the recording head 4 is carried in left-hand side is arranged, and the platen 6 is arranged under the recording head 4.
[0003]The recording head 4 is a head of the inkjet method which records on the web material 2, there are the m ink discharge openings 16 shown in drawing 27 at the tip of the ink discharge part 15, although not illustrated, it has an ink chamber inside and the regurgitation of the ink droplet is carried out according to a picture signal from the m deliveries 16. Although not illustrated, the carriage drive motor is connected with the carriage 5 via the timing belt.
Along with the guide shaft 5a, reciprocation moving is carried out with this carriage drive motor.

[0004]In order to connect record of each line normally, high degree of accuracy is required of the feed accuracy of the web material 2 by the conveyance lower roller 7. For this reason, an outer diameter is finished with sufficient accuracy, and the conveyance lower roller 7 uses a pulse motor with high stopping accuracy as a drive, and is controlling angle of rotation by the pulse.
[0005]In a recorder, if the feed roller 11 rotates with a feed signal, only one in the web material 2 of the topmost part will be separated, and it will be sent out among the feeding guides 9 and 10.
[0006]Subsequently, the web material 2 is guided at the feeding guides 9 and 10, and is sent and inserted between the conveyance lower roller 7 which rotates with the drive motor which is not illustrated, and the conveyance upper roller 8 which rotates in follower with this conveyance lower roller 7.
[0007]At this time, a sheet is changed into the **** state which showed the sensor arm 19-1 as the solid line in drawing 26, and the light from a light-emitting part reaches a light sensing portion in the transmission type sensor 19-2 which consists of a light-emitting part and a light sensing portion. During sheet non detection, the sensor arm 19-1 will be in the **** state shown with the dashed line, and the light from a light-emitting part will be intercepted by the sensor arm. The paper sensor 19 which consists of the sensor arm 19-1 and the transmission type sensor 19-2 by this change of state performs back end detection of a sheet.
[0008]Subsequently, the web material 2 will be stopped, if it pulls through the platen 6 by the carrying force by the conveyance lower roller 7 and the conveyance upper roller 8 further, and it is led to the up-and-down rollers 12 and 13, the tip of the web material 2

pulls and it is put between the up-and-down rollers 12 and 13.
[0009]Although the conveyance lower roller 7 is interlocked with and it rotates, since many transportation quantity is set up a little and the tension lower roller 12 makes pinching power of the web material 2 weaker than the conveyance up-and-down rollers 7 and 8, a moderate tension acts on the web material 2, and it ceases to slacken.
[0010]In this state, while the recording head 4 moves to the back side from a near side in drawing 24 with the carriage 5, ink is breathed out according to a picture signal and constant width (recording width) is recorded on the web material 2. In a dot diameter, the recording width W will serve as mxd, if the number of d and ink discharge openings is set to m.
[0011]Whenever record of one line is completed, the web material 2 is carried out by the conveyance lower roller 7 and the conveyance upper roller 8, step feed of recording width and the tales doses is carried out by the conveyance lower roller 7, and the following line is recorded. The details of a conveyer style are shown in drawing 28.
[0012]At the time of the step feed in which record is performed on the web material 2, the back end of the web material 2 is detected with the paper sensor 19, and the web-material back end escapes from the conveyance up-and-down rollers 7 and 8 by repeating the above operation. In order for there to be a portion sent only with the tension up-and-down rollers 12 and 13 and to prevent past [of the web material by it / delivery], Lessening angle of rotation of the motor to drive, adjusting a feed per revolution, reducing the number of the ink discharge openings which double with it and actually carry out the regurgitation of the ink, and adjusting doubling [tie] record at each step is also considered.
[0013]and the web material 2 -- an end of record for one sheet will discharge the web material 2 on the delivery tray 14 from the tension up-and-down rollers 12 and 13.
[0014]
[Problem(s) to be Solved by the Invention]Carrying out a deer. In order to tie and to go up accuracy, a web material must perform finely adjustment of angle of rotation of the drive motor at the time of the step feed which escapes from the conveyance up-and-down rollers 7 and 8, and adjustment of an ink discharge opening, but it is necessary to detect the exact amount of remainder from the conveyance up-and-down rollers 7 and 8 of the web-material back end to it with the above-mentioned composition.
[0015]Therefore, by the number of times of step feed until it counts the number of times of the step feed by the transportation roller of the web material from a recording start and the back end of a web material escapes from a paper sensor in fixed form size. It detected of which size it was a web material, and since this had determined the amount of remainder of the back end of a web material, there were the following faults.
[0016]Also in the case where it escapes from a paper sensor by the web material of a non-fixed form by the number of times of the step feed same by chance as the web material of fixed form size, and fixed form size, A5 size (148x210 mm), If there are few differences (in this case, 5.9 mm) of length, such as 5.5x8.5 inches (139.7x215.9 mm) of an inch system, than the feed per revolution of one step, the back end may be detected with a paper sensor by the number of times of the same step feed, It remains in each back end and it becomes impossible to perform optimal control corresponding to quantity.
[0017]It is in the purpose of this invention providing the image recorder which can solve the above problems and can perform highly precise record.

[0018]
[Means for Solving the Problem and its Function]Namely, a transportation means in which this invention conveys a web material and a recording device which records a picture on a web material conveyed by said transportation means, A 1st detection means to detect width of a web material, and a 2nd detection means to detect the back end of a web material conveyed by said transportation means by the upstream of said recording device, Based on information according to transportation quantity until the back end of a web material is detected by width and said 2nd detection means of a web material detected by said 1st detection means, it has transportation quantity by said transportation means, and a control means which controls at least one side of a record section of said recording device.
[0019]A transportation means which conveys a web material.
A recording device which records a picture of constant width on a web material which is provided with two or more recording elements, and is conveyed by said transportation means.
It is the image recorder provided with the above, said recording device has more numbers than the number of recording elements corresponding to said constant width of recording elements, and a recording element used for record was made variable.

[0020]Thereby, based on width of a web material, and transportation quantity required by the sheet back end, at least transportation quantity of a web material and one side of a record section are controlled, and image recording over a web-material back end field is performed with sufficient accuracy.
[0021]Rather than the number of recording elements which actually uses for record the number of recording elements with which a recording device is provided, it is made [many], and it uses selectively in the case of record of an end of a web material, and a picture is recorded on it.
[0022]
[Example]The example of this invention is described in detail using a drawing below. Drawing 1 is a figure showing the outline composition of the image recorder which is the 1st example of this invention, and drawing 2 is a sectional view of a device main frame. Drawing 26, members forming with what [same] attached the same number as drawing 28, and 17 are paper width sensors among a figure, It consists of a reflection type sensor and prepares for the carriage 5, and before a web material is conveyed on the platen 6 and starts record, once, the carriage 5 carries out reciprocation moving of the web-material top, and detects the range which has a web material then. The range which makes ink breathe out by this is limited, the regurgitation of the ink to a portion without a web material is prevented, and the dirt of a device is prevented.
[0023]Drawing 4 is a block diagram showing the control section of the recorder shown in drawing 1.
[0024]In the figure, 101 is a rise counter, counts up a pixel clock and is reset with the picture element block clock. A picture element block clock shows the effective region of image data, and is equivalent to 128 pixel clocks. 102 is a register and print dot position correction value is set up by CPU106. 103 is a comparator and compares the print dot position correction value set as the counted value and the register 102 of the rise counter 101. As a result of comparing, it is equal, or the output X is outputted when the counted

value is larger. 104 is an AND gate and does the and operation of the output value, pixel clock, and picture element block clock of the comparator 103. 100 is a FiFo memory which stores image data temporarily, and image data is written in synchronizing with a pixel clock, and it is read synchronizing with the output signal of AND gate 104. 105 is an image memory / head actuator, stores the image data from FiFo100 and drives a recording head based on the stored image data. The pulse motor in which 108 scans a recording head, and 109 are pulse motors (following drive motor) which perform paper feed. 107 is a motor driving section and drives the pulse motors 108 and 109 based on the amount of back end calculated by back end detection of the web material by a paper sensor.

[0025]Although only the : with a dot d:0.0635-mm ink discharge opening [in diameter] of several meters 128 piece recording width recording width W of W (= mxd):8.128 mm is sent in this example. Required pulse number n:. The transportation quantity t by the transportation roller in 96 pulse 1 pulse. (=W/n) :. Distance [from the transportation quantity:20 mm transportation rollers 7 and 8 by the transportation roller of the web material at the time of the transportation quantity ratio:1.01 recording start to the transportation rollers 7 and 8 of about 0.0847 mm / pulse tension rollers 12 and 13 to the detection point of the sensor arm 19-1] a:. Distance from the 10.128 mm transportation rollers 7 and 8 to an ink-discharge part: It may be 11 mm.

[0026]Next, the transportation method of the web material 2 is explained in detail.

[0027]It is sent 20 mm with the conveyance up-and-down rollers 7 and 8, and stops, and the web material 2 carries out operation which will be in the state by which it was shown by drawing 3, and detects the width of the above-mentioned web material 2. Then, the web material 2 is sent out 8.128 mm in equivalent amount with the recording width W by the conveyance lower roller 7, whenever record of the party by the recording head 4 is completed. Then, this operation is repeated and it records on the deed web material 2. When it is detected that the back end of the web material 2 came near the conveyance lower roller 7 with the paper sensor 19, the size of a web material is judged by the number of times of a carrying step until it detects the web-material back end as the paper width performed by the above-mentioned with the paper sensor 19. The number of steps of paper feed until the width corresponding to the web material of each size and the paper sensor 19 detect the back end, and the amount of remainder from the transportation roller 7 of the web material at the time of paper sensor detection are shown in drawing 5.

[0028]For example, if the number of steps to the back end detection by the paper sensor 19 becomes 33 times at 210 mm, it will be judged as A4 size, and width controls control of a drive motor suitable for the amount of back end remainder of 8.776 mm, and the number of ink discharge openings.

[0029]About control of a drive motor and the number of ink discharge openings, **** control indicated in the Japanese-Patent-Application-No. No. 272394 [two to] gazette is performed. At this example, it is 0 dot (with no amendment) of number of shift pulses 96 pulse print dot position amendment of (1) drive motor.

(2) The number of shift pulses 95 pulse print dot of 3 dots of number of shift pulses 93 pulse print dot position amendment (5) drive motor of 2 dots of number of shift pulses 94 pulse print dot position amendment (4) drive motor of 1 dot of number of shift pulses 95 pulse print dot position amendment (3) drive motor of a drive motor. Five kinds of control of 0 dot of position amendment are performed.

[0030]Control of (2) is made into 95 pulses to the numbers of shift pulses of the drive motor 109 being usually 96 pulses, the feed per revolution at the time of step feed is made into 95/96 [usual], and it is made for example, not to perform the regurgitation of one nozzle of the downstream most among ink discharge openings further.
[0031]Control of the number of shift pulses of a drive motor and an ink discharge opening as well as [other control] control of (2) is performed.
[0032]In drawing 6, it is what took the error of doubling [tie] record of the amount of remainder of the back end from the conveyance lower roller 7 of the web material in the case of performing the five above-mentioned kinds of control on a horizontal axis along the vertical axis, and, as for the negative error, the state where a dot and a dot lap is shown in the state where a crevice is made between dots as for a positive error. And according to the amount of remainder of the back end, it records by choosing few control methods with error most out of these five.
[0033]For example, since the amount of remainder of the back end is set to 8.776 mm if it was judged as the web material of the above-mentioned A4 size, control of the following step feed is sent 8.128 mm in a similar manner with usual by (1), and is recorded as 128 nozzle **. The amount of remainder of the back end at this time is set to 0.648 mm at 8.776 mm - 8.128 mm, and then controls (4) for record of about 0.009 mm of deed errors. The web-material back end separates from the following record from the conveyance lower roller 7 thoroughly, since it is sent only with the tension lower roller 12, consider it the case where the amount of remainder of the back end is 0, the same way, and an error should just perform record which is about 0.004 mm by control of (5), but. In practice, since the sheet back end is sent about 15.4 mm from the conveyance lower roller 7 and starts the Records Department, it cannot carry out, but it becomes the end of record. If the number of times to back end detection according [width] to a paper sensor at 148 mm is 23 times, it will become A5 size and the amount of back end remainder will be set to 3.056 mm. In this case, an error performs record which is about 0.007 mm by controlling (3).
[0034]In this example, since the gap of the conveyance lower roller 7 and an ink discharge part is 11 mm, when the web-material back end separates from the conveyance lower roller 7 and is sent not less than about 2.96 mm, since the Records Department separates from a web material, record of the following step cannot be performed. If the number of times to back end detection according [width] to the paper sensor 19 at 139.7 mm is 23 times, it will be set to 5.5x8.5 inches, and the amount of back end remainder will be set to 8.956 mm. In this case, the following step performs control without amendment of (1), and sends it 8.128 mm, and the amount of back end remainder in this time is set to 0.828 mm. Record whose deed error is about 0.007 mm about control of (4) can be performed here. With the sheet of 5.5x8.5-inch size and A5 size, although the number of steps to paper sensor detection is the same at 23 times, the amount of remainder of the back end is set to 8.956 mm and 3.056 mm, and the optimal control differs. This judgment is made by detecting width. The amount of remainder of the back end is detected by the number of steps of delivery until the width and the paper sensor 19 of a web material detect the back end similarly, as drawing 6 shows, control which was most suitable for the amount of remainder of the back end is performed, and the web material of other sizes also records high-precision bond doubling.
[0035]Drawing 7 and drawing 8 are flow charts which show the control procedure of this

device performed by CPU106. If waiting and a start command are received for the Koppies Tart command at Step S201, a web material will be conveyed from the conveyance lower roller 7 to a 20-mm place at Step S202, and it will wait for the end of a feed at Step S203. Drive the pulse motor 108 at Step S204 after that, the carriage 5 is made to scan, the width of a web material is detected by the paper width sensor 17, and it judges which fixed form size it is, and shifts to the copy mode (Step S205) corresponding to each size. At Step S205, record control corresponding to each fixed form size is performed.

[0036]The control procedure of the copy mode of A4 size is shown in drawing 7. The carriage 5 is first moved in S210, from an ink discharge part, ink is made to breathe out, record of the 1st line is performed, and the paper sensor 19 judges ON or OFF at Step S211. Since it is not A4 size if the paper sensor 19 is OFF (sheet un-detecting), it ends, and it shifts to the delivery subroutine of Step S206 of drawing 7. At Step S211, if the paper sensor 19 is ON (sheet detection), Step S212 will perform step feed of drive-motor 96 pulse, and then record of the 2nd line will be performed S213. Next, the paper sensor 19 judges in ON or OFF, if it is OFF, it will end like Step S211, and it shifts to the delivery subroutine of Step S206, and, as for the case of ON, step feed of 96 pulses of the drive motor 109 of Step S215 is performed. Record is continued by repeating processing of S213 ->S214 ->S215 until it is set [whether the paper sensor 19 is come by off at Step S214 after this, and] to n= 33, Since record of the 34th line was performed at Step S216, and the paper sensor 19 detected in ON or OFF at Step S217 after that, it ended since it was not A4 size when it was ON, and it checked that it was A4 size when it was OFF, Step feed of 96 pulses of the drive motor 109 is performed at Step S218, and record of the 35th line is performed at Step S219. Next, 93 pulse delivery of the drive motor 109 of Step S220 is performed as control (4), record of the 36th line which carries out 3-pixel amendment of Step S221 next is performed, and it ends, and shifts to the delivery subroutine of Step S206 in drawing 6.

[0037]And delivery is operated by S206, and at Step S207, the end of delivery will be returned to standby, if it judges whether it is a continuation copy, it will shift to the feed subroutine of Step S202 if it is a continuation copy, and it is not a continuation copy at waiting and the after-end step S208.

[0038]Although drawing 8 explained the case where paper width was judged to be A4 at Step S204, The same may be said of the case where it is judged as the width of other fixed form sizes, and others are the same only by performing n of Step S213 to how many lines, Step S216 becoming record of the how many lines, or the paper feed of Steps S218-S221 after it and control of record changing with each sizes again.

[0039](Other examples) Drawing 9 - drawing 14 are used and explained about the 2nd example of this invention below. Although the 1st example explained the image recorder which uses only the web material of fixed form size, use of non-fixed form size is enabled in this example.

[0040]Drawing 9 is a figure showing the outline composition of the image recorder of this example, and the distance to the detection point of the sensor arm 19-1 has become 14.055 mm from the conveyance lower roller. Others are the same composition as the 1st example.

[0041]Drawing 10 has shown the amount of remainder from the width corresponding to the web material of each size in the 2nd example, the paper feed number of steps to the

web-material detection by the paper sensor 19, and the conveyance lower roller 7 of the web material at the time of back end detection of the web material by the paper sensor 19.
[0042]In the web material of fixed form size, the number of steps to width and back end detection performs optimal control like the first example from the table of drawing 10.
[0043]Drawing 11 shows the amount of remainder of the back end in each control in the 2nd example, and the relation of the error of doubling [tie]. The line which is in a place with an amount of remainder of 5.927 mm of the back end here shows the detection point of the paper sensor 19-1. Although a actual detection point is in a 14.055-mm place from the conveyance lower roller 7, in order to explain plainly, it is shown in the position which the feed per revolution of 8.128 mm for one step shifted.
[0044]When the web material of a non-fixed form is conveyed here, the width of a web material and the number of steps to back end detection of the web material by the paper sensor 19 stop suiting the relation shown by drawing 10. In this case, after the paper sensor 19 has detected the back end, the amount x of remainder of the back end is set to 5.927<=x<14.055. This following step feed is sent 8.128 mm by the usual control of (1).
[0045]It becomes the amount x-2.201<=x<5.927 of remainder of the back end in this state. When x is negative here, it means that the back end is in the downstream, separates from the conveyance lower roller 7, and is sent with the tension roller 12 rather than the conveyance lower roller 7. Therefore, in the amount x of remainder of the back end, in 0<=x<5.927, the error of doubling [tie] becomes 0 at the time of an end of this step, - When the amount x of back end remainder in the time of 2.201<=x<0 [19], i.e., a paper sensor, detecting the back end of a web material suits 5.927<=x<8.128, it becomes 0-22.01 micrometers of errors of the range of 5.927<=x<8.128 on the control (1) shown by drawing 11. And (3) is controlled by the following step. When it is the amount x-2.201<=x<0 of remainder of the back end in the time of controlling (3), as for an error, an error goes into the range of -22.02micrometer-37.25micrometer by 37.25 micrometers and 0<=x<5.927 like the amount of back end of 0 mm in drawing 11.
[0046]Thus, when the detection point of the paper sensor 19 is made into a suitable position also in the web material of non-fixed form size and the width and the paper sensor 19 of a web material control by judging it as non-fixed form size by the number of steps which detects the back end, it can perform doubling [tie] little record with error.
[0047]Drawing 12 - drawing 14 are flow charts which show the control procedure of the device which carried out the 2nd example. If waiting and a start command are received for the Koppies Tart command at Step S301, a web material will be conveyed from the conveyance lower roller 7 to a 20-mm place at Step S302, and it will wait for the end of a feed at Step S303. Drive the pulse motor 108 at Step S304 after that, the carriage 5 is made to scan, the width of a web material is detected by the paper width sensor 17, and it judges which fixed form size it is, and shifts to the copy mode (Step S305) corresponding to each size. At Step S305, record control corresponding to each fixed form size is performed. If it is non-fixed form size, it will shift to Mohd for non-fixed form sizes who explains by drawing 14.
[0048]The control procedure of the copy mode of A4 size is shown in drawing 13. The carriage 5 is first moved at Step S310, from an ink discharge part, ink is made to breathe out, record of the 1st line is performed, and the paper sensor 19 judges ON or OFF at Step S311. Since it is not A4 size if it is in the state where the paper sensor 19 is not detecting OFF, i.e., a web material, it is judged as a non-fixed form and shifts to 96 pulse

delivery of the drive motor 109 of Step S326 as control of non-fixed form size. If it is in the state where the paper sensor 19 is detecting ON, i.e., a web material, at Step S311, step feed of 96 pulses of the drive motor 109 will be performed at Step S312, and then record of the 2nd line will be performed at Step S313. Next, it judges in ON or OFF, and if the paper sensor 19 is OFF, it will judge it as non-fixed form size like Step S311, and will shift to Step S326. In ON, step feed of 96 pulses of the drive motor 109 of Step S315 is performed. Record is continued by repeating processing of S313 ->S314 ->S315 until it is set [whether the paper sensor 19 is come by off at Step S314 after this, and] to n= 33, Record of the 34th line is performed at Step S316, and the paper sensor 19 detects in ON or OFF at Step S317 after that, if it is ON, it is a non-fixed form, and since the back end has not come to the paper sensor 19 yet, step feed of 96 usual pulses is performed at Step S322. And the paper sensor 19 judges OFF or ON at Step S324, and if it is ON, paper feed of the 96 following pulses will be performed at Step S325, and next, n (35<=n) line eye is recorded at Step S323, and it records by returning to Step S323 again. Continuously, after being come by off, step feed of 96 pulses of the drive motor 109 of Step S326 is performed as control (1) of the back end for non-fixed form sizes, and then the usual record is performed at Step S327, until the paper sensor 19 is come by off at Step S324. And next, step feed of drive-motor 94 pulse of Step S328 is performed as control (3), 2-pixel amendment is recorded at Step S329, and it shifts to the delivery subroutine of Step S306. When the paper sensor 19 is set to OFF at Step S317, it judges that it is A4 size, the same control as Steps S218-S221 of the 1st example is performed at Steps S318-S321, and it shifts to the delivery subroutine of Step S306.

[0049]When it is judged as non-fixed form size at Step S304, it becomes the control shown by drawing 14. The carriage 5 is first moved at Step S330, from an ink discharge part, ink is made to breathe out, record of the 1st line is performed, and the paper sensor 19 judges ON or OFF at Step S331. Since it will shift to Step S336 as control of the back end if it is OFF here, and the back end has not come to the paper sensor 19 yet if it is ON, step feed of 96 usual pulses is performed at Step S332.

[0050]And the paper sensor 19 judges OFF or ON at Step S324, and if it is ON, paper feed of the 96 following pulses will be performed at Step S335, and next, n (2<=n) line eye is recorded at Step S333, and it records by returning to Step S333 again. After being come by off, step feed of 96 pulses of the drive motor 109 of Step S336 is continuously performed as control (1) of the back end for non-fixed form sizes, until the paper sensor 19 is come by off at Step S334, and then, the usual record is performed at Step S337. And next, step feed of 94 pulses of the drive motor 109 of Step S338 is performed as control (3), 2-pixel amendment is recorded at Step S339, it shifts to the delivery subroutine of Step S306, and delivery is operated. At Step S307, the end of delivery will be returned to standby, if it judges whether it is a continuation copy, it will shift to the feed subroutine of Step S302 if it is a continuation copy, and it is not a continuation copy at waiting and the after-end step S308.

[0051]Although the web material was performing the 1st example and the 2nd example with longitudinal feed, when the web material of a crossfeed is also able to be included in this, both the width of the longitudinal feed of A4 size and the crossfeed of A5 size is 210 mm, for example. And if the number of steps of back end detection is the 1st example, it will be 33 times and 15 times. Then, if it is the 33 numbers of steps in 210 mm in width and is the 15 numbers of steps in the longitudinal feed of A4 size, and 210 mm in width,

it will be judged as the crossfeed of A5 size and optimal control will be performed.
[0052]Although controlled using the number of steps of paper feed until the paper sensor 19 is come by off in the above-mentioned example, it may control using time until the paper sensor 19 is instead turned off from a recording start.
[0053]By having a control means which changes both or one side of a record section of the transportation quantity by a sheet conveying means, and said recording device by the number of times of step conveyance by the sheet conveying means of the time of detecting the width of the web material detected as explained above, and the back end of a web material, It is effective in the ability to perform highly precise image recording also in a web-material end.
[0054](The 3rd example) The 3rd example of this invention is described below. It is made more than the number of the ink discharge openings which actually use the number of all the ink discharge openings of the recording head 4 for record in this example, After escaping before escaping from a conveyance up-and-down roller, it carries out as [arise / as the use range in all the ink discharge openings (it is also called an injection element) of a recording head is changed / to each spacing / a blank part], and is made to perform exact bond doubling.
[0055]Drawing 15 is a figure showing the outline composition of the image recorder of this example. The cassette 103 by which 101 laminated two or more web materials 102 at the pars basilaris ossis occipitalis by the main part of an image recorder is arranged. The carriage 105 which carries the recording head 104 in the drawing 15 left-hand side is arranged, and the platen 106 is arranged under the recording head 104.
[0056]The recording head 104 is a head of the inkjet method which breathes out an ink droplet and records on the web material 102 by making a change of state occur in ink using thermal energy here, the injection element 116 shown in drawing 16 at the tip of the injection element part 115 -- those with m nozzle -- although not illustrated, it has an ink chamber inside and the regurgitation of the ink droplet is carried out according to a picture signal from the m injection elements 116. Although not illustrated, the carriage drive motor is connected with the carriage 105 via the timing belt.
Along with the guide shaft 105a, reciprocation moving is carried out with this carriage drive motor.

[0057]In order to connect record of each line normally, high degree of accuracy is required of the feed accuracy of the web material 102 by the conveyance lower roller 107. For this reason, an outer diameter is finished with sufficient accuracy, and the conveyance lower roller 107 uses a pulse motor with high stopping accuracy as a drive, and is controlling angle of rotation by the pulse.
[0058]In a recorder, if the feed roller 111 rotates with a feed signal, only one in the web material 102 of the topmost part will be separated, and it will be sent out among the feeding guides 109 and 110.
[0059]Subsequently, the web material 102 is guided at the feeding guides 109 and 110, and is sent and inserted between the conveyance lower roller 107 which rotates with the drive motor which is not illustrated, and the conveyance upper roller 108 which rotates in follower with this conveyance lower roller 107.
[0060]Subsequently, the web material 102 will be stopped, if it pulls through the platen 106 by the carrying force by the conveyance lower roller 107 and the conveyance upper

roller 108 further, and it is led to the up-and-down rollers 112 and 113, the tip of the web material 102 pulls and it is put between the up-and-down rollers 112 and 113.
[0061]Although the conveyance lower roller 107 is interlocked with and it rotates, since many transportation quantity is set up a little and the tension lower roller 112 makes pinching power of the web material 102 weaker than the conveyance up-and-down rollers 107 and 108, a moderate tension acts on the web material 102, and it ceases to slacken.
[0062]In this state, while the recording head 104 moves to the back side from a near side in drawing 15 with the carriage 105, ink is breathed out according to a picture signal and constant width (recording width) is recorded on the web material 102. In the pitch between injection elements, the recording width W will serve as mxp, if the number of nozzles of p and an injection element is set to m.
[0063]Whenever record of one line is completed, the web material 102 is sent out by the conveyance lower roller 107 and the conveyance upper roller 108, an equivalent amount of W is sent out by the conveyance lower roller 107 with recording width, and the following line is recorded.
[0064]record is performed on the web material 102 by repeating the above operation -- the web material 102 -- an end of record for one sheet will discharge the web material 102 on the delivery tray 114 from the tension up-and-down rollers 112 and 113. An example of the picture recorded on the web material 102 is shown in drawing 17.
[0065]In this example here, Transportation quantity L_1 by the transportation roller in several meters nozzle $_1$:128-piece recording width one step of W (= mxp); 8.128 mm of the injection element used at the time of pitch the record of p:0.0635 mm between injection elements as shown in drawing 18. (=W) It is considered as several meters nozzle $_2(m_1+1)$;129 nozzle of the transportation quantity L_2;8.128+0.0635= 8.1915-mm all injection element by the tension roller in;8.128-mm one step.
[0066]Whenever record of the party (width W) by 128 nozzles of the A section near the conveyance lower roller 107 is completed among injection element 129 nozzles of the recording head 104, L_1 delivery appearance of the web material 102 is carried out to the recording width W in equivalent amount by the conveyance lower roller 107.
[0067]If record of this state continues and the back end of the web material 102 escapes from the conveyance up-and-down rollers 107 and 108, the web material 102 will be conveyed by the tension roller 112. Transportation quantity L_2 (8.1915 mm) at this time is set up so that it may increase more than transportation quantity L_1 by the conveyance lower roller 7 for 1 pitch [the pitch p between injection elements] 0.0635 mm. Before carrying out step feed as drawing 19 shows if the same record as the above is continued here [0068]
[External Character 1]
記録された部分ⓐ部が記録幅Wよりも０．０６３５ｍｍ多く搬送されるためⓐ

Back end a_1 of a part comes to the position which went to the paper feed direction by 1 pitch of injection elements without coming to the front end part of 128 nozzles of the A section. So, in this state, it records by using 128 nozzles of the injection element used for record as the nozzle of the B section shifted to the 1-pitch part paper feed direction, and the blank bond which is not is performed. Beforehand, the back end of the web material 102 determines the step feed which escapes from the conveyance up-and-down rollers 107 and 108 from the length of the web material, and determines the timing which

changes the nozzle of the A section and the B section here.
[0069]In this example, the gap of the transportation rollers 107 and 108 and an injection element The neighborhood, Since the step feed after the back end of the web material 2 escapes from the transportation rollers 107 and 108 is turned one, is lent and there is, the number of nozzles of the injection element increases only one nozzle from 128 nozzles of the injection element used at the time of record, but. [no] When there is the two number of times or more of the step feed after the gap of the transportation rollers 107 and 108 and an injection element is large and the back end of the web material 102 escapes from the transportation rollers 107 and 108, What is necessary is to have a head with many nozzles only several minutes of the step feed, and just to move the nozzle used for the number of times conveyed with the tension rollers 112 and 113 one every nozzle in all.
[0070]What is necessary is to arrange the sensor for web-material detection upstream of the conveyance lower roller 107, to detect the back end of the web material 102, and just to determine the timing which changes the injection element to be used in this example, when the length of the web material 102 is not constant. Although many transportation quantity L_2 by the tension roller 112 is set up by 1 pitch of the pitch p between injection elements rather than transportation quantity L_1 by the conveyance lower roller 107 in this example, two or more pitches -- it set up mostly, and it was set up when shifting the injection element used for record -- it may shift a pitch every.
[0071](The 4th example) Below, drawing 20 - drawing 22 are used and the 4th example of this invention is described. In the 4th example, the tension rollers 117 and 118 are upstream of the Records Department, and the transportation rollers 107 and 108 are downstream. It is conveyed by the tension rollers 117 and 118 at first, and stops in the state of drawing 20, and the web material 102 records the recording width W (8.128 mm) with the nozzle of the C section which are 128 nozzles of the downstream among 129 nozzle **** injection elements. Next, the tension rollers 118 and 117 perform transportation quantity L_3;8.128mm - 0.0635 mm (= 8.0645 mm) delivery (drawing 21). NOZU which is the C section here [0072]
[External Character 2]
ルで記録された記録部ⓑの後端ｂ$_1$ はＣ部の１２８ノズルの前端部ではなく

It comes to the position of the upstream only 0.0635 mm. Then, the following record records with 128 nozzles of the D section which shifted from the C section to 1 nozzle upstream.
[0073]Since a web-material tip is sent from just before the nip of the transportation rollers 107 and 108 to conveyance of the web material 102 of this following step, transportation quantity is set to 8.128 mm. Therefore, the injection element used [that drawing 22 shows when the web material 102 is sent by the conveyance lower roller 107 and] for record serves as 128 nozzles of D, and is recorded to the back end of the web material 102.
[0074]Although the number of injection elements is used as 129 nozzles in this example, It is good to shift the nozzle which only the number of steps prepares a head with many nozzles for the case where a number step is taken for the gap from an injection element to a transportation roller to be large, and for a web-material tip to go into a transportation roller, and is used one by one.
[0075](The 5th example) The 5th example is described using drawing 23 - drawing 25. In

the 5th example, at the time of record, the recording head 104 is immobilization and its injection element 115 is in a main part by m+6 nozzle **** right-angled to a paper feed direction. While the web material 102 is conveying continuously on the platen 106 with the transportation rollers 107 and 108 and the tension rollers 112 and 113, as shown by drawing 24, record of width mxp (pitch between injection elements) is performed with the injection element m nozzle of the E section. When the web material 102 has shifted in the right-angled direction (the direction of an arrow) to a paper feed direction by curl of the web material 102, etc. before the web material 102 is sent with the transportation rollers 107 and 108, as drawing 8 shows at this time, A gap of the web material 102 is detected with the position sensing device which is not illustrated, and the injection element used for record is changed into m nozzle shown in the F section. Although the injection element from which only one nozzle shifted was used in drawing 25, the quantity to shift is changed with the value detected by the sensor, and should just record in the center of the web material 102.

[0076]By having more [as explained above] numbers than the number of injection elements equivalent to recording width of injection elements, selection of the injection element which is doubled with the state of a recording medium and used for record is enabled, and it is effective in changing a recording position at the time of record of the end of a web material, and being able to perform highly precise record.

[0077](in addition to this) In addition, especially this invention also in an ink jet recording method, Although it had means (for example, an electric thermal-conversion object, a laser beam, etc.) to generate thermal energy as energy exploited in order to make ink discharge perform and the device which has a recording head of the method which makes the change of state of ink occur with said thermal energy was explained, According to this method, the densification of record and highly-minute-izing are possible.

[0078]About the typical composition and principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is preferred. Although this method is applicable to both what is called a type on demand and a continuous system, On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the fluid (ink) is held in the case on demand type. By impressing at least one driving signal which gives the rapid rise in heat which supports recorded information and exceeds nucleate boiling, Since make an electric thermal-conversion object generate thermal energy, the thermal action side of a recording head is made to produce film boiling and the air bubbles in the fluid (ink) corresponding to this driving signal at the couple 1 can be formed as a result, it is effective. A fluid (ink) is made to breathe out via the opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. Since growth contraction of air bubbles will be appropriately performed instancy if this driving signal is made into the shape of a pulse form, the regurgitation of a fluid (ink) excellent in especially the response can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is written in the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. If the conditions written in the U.S. Pat. No. 4313124 specification of the invention about the temperature rising rate of the above-mentioned thermal action side are adopted, further outstanding record can be performed.

[0079]A delivery which is indicated by each above-mentioned specification as composition of a recording head, The composition using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the composition arranged to the liquid route and the field to which a thermal action part other than the combination composition (a linear shape liquid flow channel or a right-angled liquid flow channel) of an electric thermal-conversion object is crooked is also included in this invention. In addition, two or more electric thermal-conversion objects are received, The effect of this invention is effective also as composition based on JP,59-138461,A which indicates the composition whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the composition which uses a common slit as the discharge part of an electric thermal-conversion object, or thermal energy is made to correspond to a discharge part. Namely, no matter the gestalt of a recording head may be what thing, it is because it can record now efficiently certainly according to this invention.
[0080]In addition, the recording head by which the thing of a serial type like an upper example was also fixed to the device main frame, Or the recording head of the exchangeable chip type with which the electric connection with a device main frame and supply of the ink from a device main frame are attained by a device main frame being equipped, Or this invention is effective also when the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one is used.
[0081]Since the effect of this invention can be stabilized further, it is preferred to add the recovery means for a recording head provided in this invention as composition of a recorder, a preliminary auxiliary means, etc. The capping means for a recording head if these are mentioned concretely, It is effective in order to perform record which was stabilized as for performing preliminary discharge Mohd who performs a cleaning means, application of pressure or a suction means, an electric thermal-conversion object, a heating element different from this or the preheating means by such combination, and the regurgitation different from record.
[0082]Although only one piece was provided also about the kind thru/or the number of the recording head carried, for example corresponding to monochromatic ink, it may be by some which are provided corresponding to two or more ink which differs in others and a recording color or concentration as for the number of pieces. Namely, for example as a recording mode of a recorder not only in the recording mode of only mainstream colors, such as black, Although a recording head may be constituted in one or the paddle gap by two or more combination may be sufficient, it may be the device provided with full color at least one by the double color color of a different color, or mixed colors.
[0083]In addition, in this invention example described above, although ink is explained as a fluid, What is ink solidified by a room temperature or less than it, and is softened or liquefied at a room temperature, Or in an inkjet method, since what carries out temperature control is common as a temperature control is performed for ink itself within the limits of not less than 30 ** 70 ** or less and it is in the stable regurgitation range about the viscosity of ink, ink should just make the shape of liquid at the time of use record signal grant. In addition, it is carried out whether the ink which is prevented by making the temperature up by thermal energy use it positively as energy of the change of state from the solid state of ink to a liquid state, or is solidified by a leaving state for the purpose of antiflashing of ink is used, Anyway, this invention can be applied also when using the ink of the character which ink liquefies by grant according to the record signal

of thermal energy, and is begun and liquefied with thermal energies, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a recording medium. The ink in such a case is good for a porous sheet crevice or a breakthrough which is indicated to JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the state where it was held as a solid. In this invention, the most effective thing performs the film boiling method mentioned above to each ink mentioned above.
[0084]In addition, the gestalt of the reproducing unit combined with the reader besides what is used as a generating picture terminal of information treatment apparatus, such as a computer, etc. as a gestalt of this invention ink-jet recording device, and the facsimile machine which has a transmitting function further may be taken.
[0085]
[Effect of the Invention]As mentioned above, according to this invention, it becomes possible to perform proper recording operation also to a web-material end, and it becomes possible to perform doubling [tie] a picture with high precision.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a figure showing the outline composition of the image recorder which applied this invention.
[Drawing 2]It is a sectional view of the image recorder shown in drawing 1.
[Drawing 3]It is a figure showing the state where the web material stopped.
[Drawing 4]It is a block diagram showing the control section of the image recorder shown in drawing 1.
[Drawing 5]It is a figure showing the relation between the number of steps to the width corresponding to the web material of each size, and back end detection, and the amount of remainder.
[Drawing 6]It is a figure showing the amount of remainder of the back end at the time of performing each control in the 1st example, and the relation of the error of record bond doubling.
[Drawing 7]It is a flow chart which shows the procedure of the control in the 1st example.
[Drawing 8]It is a flow chart which shows one copy of drawing 7 in detail.
[Drawing 9]It is a figure showing the outline composition of the image recorder by the 2nd example of this invention.
[Drawing 10]It is a figure in the 2nd example showing the relation between the number of steps to the width corresponding to the web material of each size, and back end detection, and the amount of remainder.
[Drawing 11]In the 2nd example, it is a figure showing the amount of remainder of the back end at the time of performing each control, and the relation of the error of record

bond doubling.
[Drawing 12]It is a flow chart which shows the procedure of the control in the 2nd example.
[Drawing 13]It is a flow chart which shows one copy of drawing 12 in detail.
[Drawing 14]It is a flow chart which shows one copy of drawing 12 in detail.
[Drawing 15]It is a sectional view of the image recorder by the 3rd example of this invention.
[Drawing 16]It is a figure explaining a recording head.
[Drawing 17]It is a figure showing an example of a recorded image.
[Drawing 18]It is a figure showing the outline composition of the image recorder by the 3rd example.
[Drawing 19]It is a figure explaining the carrying state of a web material, and the relation of a recording position.
[Drawing 20]It is a figure showing the outline composition of the image recorder by the 4th example.
[Drawing 21]It is a figure showing the carrying state of a web material, and the relation of a recording position.
[Drawing 22]It is a figure explaining the carrying state of a web material, and the relation of a recording position.
[Drawing 23]It is a figure showing the outline composition of the image recorder by the 5th example.
[Drawing 24]It is a top view showing the relation between the recording head in the image recorder shown in drawing 23, and a web material.
[Drawing 25]It is a top view showing the relation between the recording head in the image recorder shown in drawing 23, and a web material.
[Drawing 26]It is a sectional view of the conventional image recorder.
[Drawing 27]It is a figure explaining a recording head.
[Drawing 28]It is a figure showing the outline composition of the image recorder shown in drawing 26.
[Description of Notations]
4 Recording head
7 and 8 Conveyance up-and-down roller
12, 13 tension up-and-down roller
17 Paper width sensor
19 Paper sensor

CLAIMS

[Claim(s)]
[Claim 1]An image recorder comprising:
A transportation means which conveys a web material.
A recording device which records a picture on a web material conveyed by said transportation means.
A 1st detection means to detect width of a web material.
A 2nd detection means to detect the back end of a web material conveyed by said

transportation means by the upstream of said recording device, A control means which controls at least one side of a record section of transportation quantity by said transportation means, and said recording device based on information according to transportation quantity until the back end of a web material is detected by width and said 2nd detection means of a web material detected by said 1st detection means.

[Claim 2]The image recorder according to claim 1 which is provided with the following and with which transportation quantity of said 2nd transportation part is characterized by being size rather than transportation quantity of said 1st transportation part.
The 1st transportation part in which said transportation means conveys a web material by the upstream of said recording device.
The 2nd transportation part that conveys a web material by the downstream of said recording device.

[Claim 3]The image recorder according to claim 1 which said transportation means carries out specified quantity [every] step conveyance of the web material, and is characterized by information according to said transportation quantity being the number of times of said step conveyance.
[Claim 4]An image recorder given in one paragraph of claims 1 thru/or 3, wherein said recording device has a gestalt of an ink jet recording head which records by carrying out the regurgitation of the ink to a web material.
[Claim 5]The image recorder according to claim 4, wherein said ink jet recording head carries out the regurgitation of the ink droplet by making a change of state occur in ink using thermal energy.
[Claim 6]An image recorder making variable a recording element characterized by comprising the following which said recording device has more numbers than the number of recording elements corresponding to said constant width of recording elements in an image recorder, and is used for record.
A transportation means which conveys a web material.
A recording device which records a picture of constant width on a web material which is provided with two or more recording elements, and is conveyed by said transportation means.

[Claim 7]The image recorder according to claim 6 having a selecting means which chooses a recording element used for record from said two or more recording elements.
[Claim 8]The image recorder according to claim 7, wherein said transportation means performs step conveyance for said web material for every record of said constant width and said selecting means chooses a recording element used for record according to a carrying state of said web material.
[Claim 9]The image recorder according to claim 8 which is provided with the following and characterized by said selecting means changing a recording element used for record before and after the back end of a web material escapes from said 1st transportation part.
The 1st transportation part by which said transportation means has been arranged at the upstream of said recording device.
The 2nd transportation part that is arranged at the downstream of said recording device and conveys a web material with many transportation quantity rather than said 1st

transportation part.

[Claim 10]The image recorder according to claim 8 which is provided with the following and characterized by said selecting means changing a recording element used for record before and after a tip of a web material goes into said 2nd transportation part.
The 1st transportation part by which said transportation means has been arranged at the upstream of said recording device.
The 2nd transportation part that is arranged at the downstream of said recording device and conveys a web material with small transportation quantity rather than said 1st transportation part.

[Claim 11]The image recorder according to claim 6 to 11, wherein said recording element is what carries out the regurgitation of the ink droplet from a delivery by making a change of state occur in ink.
[Claim 12]The image recorder according to claim 11, wherein said recording element carries out the regurgitation of the ink droplet by making a change of state occur in ink using thermal energy.